



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the Application of	)	
	)	
<b>GARY L. SHANKLIN</b>	)	
	)	Examiner: Lynda Salvatore
Serial No. 09/753,134	)	
	)	
Filed: December 29, 2000	)	Group Art Unit: 1771
	)	
Title: ANTIMICROBIAL ABSORBENT	)	
ARTICLE, AND METHODS OF	)	
MAKING AND USING THE SAME	)	

The Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313

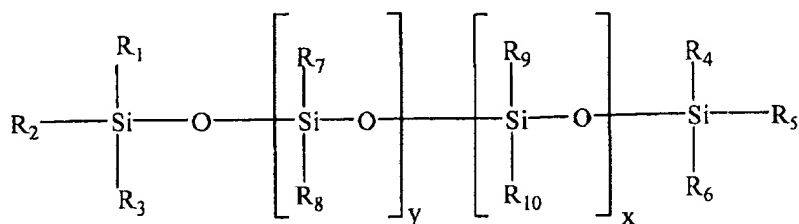
**DECLARATION PURSUANT TO 37 CFR 1.131**

I, Gary L. Shanklin, declare as follows:

1. I received a Bachelor of Science degree in Chemistry from University of Wisconsin - Stevens Point in 1977.
2. I have been employed by Kimberly-Clark Worldwide, Inc., Neenah, WI, since April, 1978. As an employee of Kimberly-Clark, I have worked areas of research including facial tissue technology.
3. Prior to July 29, 1999, the publication date of PCT Patent Application Publication WO 99/37860 assigned to Kimberly-Clark Worldwide, Inc., I conceived and reduced to practice in the United States an antimicrobial, multi-ply absorbent article having an antimicrobial agent applied to an inner surface and a polysiloxane composition applied to an outer surface. The attached portions of an Invention Disclosure form describe the general concept of an absorbent article having an inner ply(s) or layer(s) treated with a virucidal or germicidal composition and having an outer ply(s) or layer(s) treated with a siloxane composition. The attached document also describes a specific example of a product having a virucidal composition on an inner ply and a siloxane ("silicone") composition on an outer ply. This Invention Disclosure form

was completed, signed and dated by me prior to July 29, 1999. All of the dates in the Invention Disclosure form, which have been blanked out for the purposes of this submission, are earlier than July 29, 1999. The changes that have been made to the attached pages are the blanking out of dates, internal reference numbers, and confidential internal analysis.

The attached pages describe examples of compositions that can be used to make antimicrobial, multi-ply absorbent articles. Exemplary virucidal or germicidal compositions include carboxylic acid compositions, with and without a surfactant, as described in U.S. Patent Nos. 5,828,912 (Hossain et al.), 4,764,418 (Kuenn et al.), and 4,738,847 (Rothe et al.). Exemplary siloxane compositions include amine-modified polysiloxanes, as described in a document referred to as "Goulet et al.". This Goulet et al. document was related to the patent application that eventually published as PCT Patent Application Publication WO 99/37860. The amine-modified polysiloxanes described in the Goulet et al. document include polysiloxanes covered by the following formula as recited in claim 9, as filed, of U.S. Patent Application Serial No. 09/753,134:




The attached pages further describe absorbent articles containing an antimicrobial composition on an inner ply(s) or layer(s) and containing a siloxane composition on an outer ply(s) or layer(s). Exemplary embodiments described include 3-ply tissue, 2-ply tissue and an absorbent pad. Exemplary products listed include facial tissue, bath tissue, paper towels, industrial wipers, diapers, incontinence pads and sanitary napkins.

Thus, the disclosure in the attached pages show, either explicitly or by reference, absorbent articles with an inner surface containing an antimicrobial agent and with an outer ply containing an amine-modified polysiloxane of the formula shown above. The disclosure in the attached pages also show antimicrobial, multi-ply absorbent articles

formed as facial tissues, bath tissues, or paper towels, which contain an antimicrobial agent on an inner surface and a siloxane composition on an outer ply.

4. *I declare that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the above applications or any patent granted therein.*

  
\_\_\_\_\_  
Gary L. Shanklin  
  
19 November 2003  
\_\_\_\_\_  
Date

# Invention Disclosure

## Submitter:

Send the signed original and one copy of this form to Kimberly-Clark Corporation, Patent Department, Neenah, WI. Answer all parts of this form. Two corroborators must understand the invention. The submitter(s) and both corroborators must sign and date the reverse side of this form in blue ink, as well as every additional sheet submitted with it. The last part of this form is recommended when additional sheets are required. If your group has a patent facilitator, preview the original with him or her.

Disclosure No. \_\_\_\_\_

Department \_\_\_\_\_

Recommended Attorney \_\_\_\_\_

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## Key Words

virucide, germicide, antibacterial, triclosan, silicone, siloxane, tissue

1. Title: **Non-Irritating Virucidal or Germicidal Tissue Made By Treating the Center Ply With a Virucidal/Germicidal Composition and Treating the Outer Plies With Siloxanes.**

2. Description (Sign and date each page. Attach pertinent drawings, photographs, etc.)

a. Summary (Should disclose invention in general, nontechnical terms)

A non-irritating virucidal or germicidal absorbent product made by treating an inner ply or layer with a virucidal or germicidal composition and treating the outer ply(s) or layer(s) with siloxanes. The virucidal or germicidal composition will remain confined to the inner ply or layer, thereby preventing irritation, and that the siloxane treated ply(s) or layer(s) will provide a pleasing, soothing, non-irritating tactile quality. In a preferred embodiment, the siloxane composition comprises an amine-modified polysiloxane, in which case the product will also entrap any absorbed fluid, holding it in contact with the virucidal or germicidal composition and preventing it from wetting through the product and contacting the user.

b. Detailed description, including specific embodiments and applicable alternatives, ranges and products, and process/apparatus variations.

This disclosure relates to an absorbent article such as facial tissue or bath tissue which comprises several plies or layers of material. The inner ply(s) or layer(s) are treated with a virucidal or germicidal composition. The outer ply(s) or layer(s) are treated with a siloxane composition.

### Plies and Layers

As used in this disclosure, the terms "plies" and "layers" refer to discrete product elements arranged in vertical juxtaposition to each other. The terms may refer to a plurality of web-like components such as in multi-ply facial tissue; or they may refer to a collection of components arranged into a functional product, such as the liner, wrap sheet, absorbent, outer cover, etc., of diapers or other personal absorbent pads.

### Virucidal or Germicidal Composition

The virucidal or germicidal composition serves to kill or inactivate any viruses or "germs" that are absorbed into the tissue with body secretions or fluids, thereby inhibiting the spread of disease. The virucidal or germicidal composition is confined to the inner ply(s) or layer(s) preventing its transfer to the skin and resultant irritation.

The virucidal or germicidal composition may comprise any of the virucides, germicides, fungicides, and disinfectants known in the art. Selection of any particular agent will be dependent on its efficacy versus relevant "germs," human safety and toxicological profile, and environmental safety and toxicological profile.

Preferred virucidal or germicidal compositions included the carboxylic acid/surfactant compositions described in *Hossain et al*, *Kuenn et al*, and *Rothe et al*; the carboxylic acid

compositions (without surfactant) described in *Hossain et al*, *Kuenn et al*, and *Rothe et al*; quaternary ammonium compounds, and triclosan.

Carboxylic acid/surfactant virucides are effective at add-ons as low as 1.0 mg/in<sup>2</sup>. The acids themselves are effective at add-ons as low as 1.5 mg/in<sup>2</sup>.

### Siloxane Composition

The siloxane composition serves to soften the tissue and contributes to a pleasing, smooth, soothing, non-irritating tactile quality. Particular siloxane compositions can be tailored to enhance the absorbency characteristics of the product, such as by inhibiting wet-through or by entrapping the secretions or fluids within the inner regions of the product.

Suitable siloxane compositions may comprise polydimethyl siloxanes, silicone glycols, epoxyfunctional silicones, carboxyfunctional silicones, hydroxyfunctional silicones, other organofunctional silicones, amine functional silicones, cationic silicones, silicone betaines, silicone amidoamine esters, silicone amidoamine phosphates, and mixtures thereof.

Especially preferred are compositions comprising amine-modified polysiloxanes, as described in Docket (Goulet et al). The amine-modified polysiloxanes preferentially reside on the outer surface of the substrate to which they are applied, either as a result of hydrogen bonding, charge attraction, or other chemical interaction, thereby providing a softness benefit on the surface and providing a degree of water or liquid repellency. However, when liquid does penetrate the outer surface, the liquid is readily absorbed by the central, non-siloxane-treated ply(s) or layer(s) and is wicked away in the x-y plane of the product. At the same time, the presence of the amine-modified polysiloxane on the opposite surface delays further penetration of the liquid to the outside of the tissue, thus trapping the liquid in the center of the product in contact with the virucidal or germicidal composition. This "one-way-valve" effect protects the user from product wet-through during normal use, entraps the fluid in contact with the virucidal or germicidal composition, and provides a softness benefit.

The typical add-on rate for the siloxane composition is about 1.5% siloxane solids per outer ply or layer.

### Preferred Embodiment

The preferred embodiment comprises a facial tissue comprising at least three plies. At least one of the center plies is treated with a virucidal composition comprising the carboxylic acid/surfactant system described in *Hossain et al*, *Kuenn et al*, and *Rothe et al*. The outer plies are treated with a siloxane composition comprising the amine-modified polysiloxanes described in



The addition rate of the virucidal composition is preferred to be 1.5 to 2.5 mg/in<sup>2</sup> of acid solids. The preferred addition rate of the siloxane composition is 1%-2% siloxane solids per outer ply.

Submitter

  
Gary Shanklin

Family Care/WOF2

Dept./Location

Signed

Month Day Year

## Invention Disclosure

Title **Non-Irritating Virucidal or Germicidal Tissue Made Treating Center Ply With Virucidal/Germicidal Composition and Treating Outer Plies With Siloxanes.**

### 2-Ply Embodiments

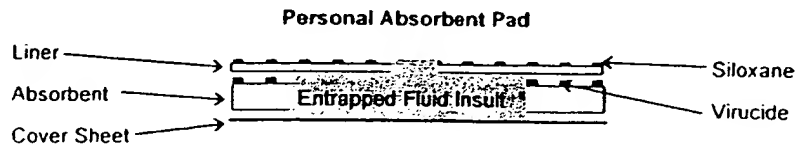
A two-ply embodiment is possible by treating the inner surfaces of each ply with the virucidal or germicidal composition and treating the outer surface of each ply with the siloxane composition.



### Other Embodiments

The disclosed silxane-virucide/germicide "sandwich" approach may be used for products other than facial tissue. Some examples of potential applications include:

- bath tissue
- paper towels
- industrial wipers
- diapers
- incontinence pads
- sanitary napkins



### Process

To produce the envisioned multi-ply/layer product, it is necessary to treat the center ply(s) or layer(s) with the virucidal or germicidal composition, ply the product together, and then crimp or seal the plies together before treating the outer plies or layer with the siloxane composition. This is necessary because the sheet will become difficult to crimp or seal after the siloxane composition has been applied.

The virucidal or germicidal composition may be applied to the center ply(s) by any of the means known in the art. Suitable means include spraying, foam application, electrostatic application, flexographic printing, and gravure printing. An especially preferred application method is smooth-roll coating.

Likewise, the siloxane composition may be applied to the outer plies by any of the means known in the art. Suitable means include spraying, foam application, electrostatic application, and flexographic printing. An especially preferred application method is gravure printing.

9 The above idea was first tried on. Describe how and when it was tried, a complete description and date of the first time the idea was tried and, if the first attempt was unsuccessful, the first time it was successfully tried.

All codes were produced in the pilot plant in The center ply was printed with the visual cue via the flexographic printer and subsequently sprayed with the virucidal ingredients at a level of 2.2 mg/in<sup>2</sup> using the WEKO sprayer. Silicone was applied with the rota-gravure on a second pass at a target level of approximately 1.5% per outer ply.

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